One Network Enterprises™

One Network Technology Overview

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One Network has built a new software platform to enable next-generation single-enterprise and multi-enterprise processes to be easily built and delivered.

A Tale of Four Historical Trends

In order to better understand the architecture of the One Network Platform, it is useful to examine four major trends that have been shaping the enterprise landscape over the past two decades.

Trend 1: The trend from departmental to enterprise to cross-enterprise processes.

The first enterprise applications that were built (mostly on mainframes) were geared towards departmental processes. Over time these eventually extended to processes that spanned the entire enterprise. However, a large number of so-called enterprise processes touch other enterprises as well. Good examples are purchase order processes, VMI processes etc. Roughly speaking enterprise processes can be classified into *private* processes and *shared* processes. While private processes have been solved in an ever more sophisticated manner, shared processes are still executed using 1960's technologies like EDI.

In the globalized economy with greater and greater outsourcing, shared processes are taking on more and more importance. Unfortunately, the state of the art for private processes, viz. ERP systems, is woefully inadequate for executing shared processes. A new architecture is required that let's companies execute both private and shared processes easily.

Trend 2: The trend towards Single Version of the Truth (SVOT)… tinged with regret at leaving behind the Best of Breed (BOB) approach.

Over the years as departmental systems proliferated, a nasty side effect emerged. Data in the enterprise started getting fragmented into multiple systems. For example the same Order might appear in an Order Management system, Warehouse Management system, Transportation Management system, Planning System etc. This quickly deteriorated into a complicated mess of integrations, multiple systems of record, out-of-synch data etc.

The solution to this came in the form of the ERP system which proposed to have a Single Version of the Truth (SVOT) across all enterprise data. A lot of companies moved towards ERP systems for this very reason.

The move to ERP's came at a heavy price. The ERP's were designed as monolithic codebases.

They were good at standardized, commodity functionality, but were frequently behind the Best of Breed (BOB) vendors or Home Grown systems in terms of differentiated functionality. This is because they were trying to be all things to all 'people' and furthermore could only be enhanced by the ERP vendor.

This situation led Nicholas G. Carr to remark in Harvard Business Review in 2003 that I.T. was no longer was no longer a strategic differentiator, but instead a commodity. He was essentially right. Every company by then had standardized processes like *General Ledger* nailed. But their ERP's were not really allowing them to change and dominate their markets.

Additionally, because of their monolithic design they were difficult to upgrade. Multi-million dollar upgrades that spanned years were not unheard of.

Finally, because of their monolithic nature they were not designed to let third parties build applications *'on'* them. Sure, third parties could build applications *'next to'* them. But then the Single Version of the Truth would be lost, defeating the key advantage of ERP.

Because of these major drawbacks to ERP, an alternative architecture with multiple Best of Breed systems hooked together via an Enterprise Service Bus and further sharing a common Master Data Management (MDM) System is still commonly used.

In the end, both represent an unsatisfactory compromise.

Trend 3: The trend towards real-time processing.

The original data processing systems were mostly transactional systems. In the nineties there was a big advance where optimized decision support systems were layered on top of the transactional systems. While these systems represented a big advance, they had a major drawback. They were all designed to be in-memory batch-oriented systems.

As competition has intensified, there has been a shift towards greater and greater degrees of real-time processes. However, the in-memory, batch optimization approach represents a key stumbling block towards moving in this direction.

While a (say) daily batch cycle may not seem like much of an issue, all of the different batch processing cycles add up. This significantly adds to total process lead times and decreases an enterprise's responsiveness to changing demand and changing conditions. It has been estimated that up to 70% of total lead times in a supply chain are 'informational' lead times rather than 'physical' lead times.

In a network architecture there is a Single Version of the Truth through an entire trading partner ecosystem.

Trend 4: The trend away from on-premise deployment and towards Software as a Service (Saas) deployment.

The final major trend has been the one from on-premise (behind the firewall) deployment to on-demand (Saas) deployment. This trend shifts the burden of running and maintaining these systems from overloaded I.T. departments to companies that specialize in this. This frees up I.T. departments to focus on building the value-added applications that truly differentiate their companies.

The One Network Platform

The One Network platform was designed from scratch to address these four major enterprise trends.

A 'Network' Platform

As mentioned earlier, today's ERP and BOB systems were designed to handle private processes. They are very weak for cross-enterprise shared processes.

To enable cross-enterprise processes a new 'Network' architecture is required.

In a network architecture there is a Single Version of the Truth through an entire trading partner ecosystem. Furthermore each partner is onboarded only once.

There are four key advantages of a network architecture which revolutionizes the execution of shared processes.

- **Enable network-svot-dependent processes.** There are a number of processes that cannot be executed at all without network-svot. We call these network-svot-dependent processes. Examples of these include Appointment Scheduling, Auctions, Ticket reservations etc.
- **Reduced cost of Integration**. Integration is one of the biggest costs in implementing shared processes. In a network architecture, since each partner is 'onboarded' only once, the cost is proportional to 'n' if there are 'n' partners rather than the typical 'n2'-proportional cost in traditional peer-to-peer messaging approaches.
- **Increased compliance.** Traditional extended enterprise systems have suffered from a key problem, viz. lack of compliance. Partners do not want to log onto onto multiple disparate systems. This means that compliance (as defined as the number of partners in the partner base that use your system) is very low in traditional extended-enterprise systems. Most of these projects have failed and companies have fallen back to traditional peer-to-peer messaging approaches. Many-to-many network systems have much higher compliance rates.
- **Process Flexibility.** The same process flexibility that is available to private processes is now available to shared processes. New shared processes can be deployed as quickly and easily as new private processes.

The key building blocks of a Network platform are:

• A **many-to-many network** data model as well as Applications that are aware of the many-to-many data model.
• **Multi-party transactions** that allow multiple trading partners to operate on the same transaction. (SVOT).
• A **multi-party Permissions Framework** that governs read and write access to data and execute-access to processes.

The One Network platform supports multiple types of multi-party deployments.

• Enterprise Deployment (Single party)
• Many-to-many (m2m)
• One-to-many (o2m)
• Many-to-many-with-primary (m2mp).

The One Network platform can be easily used for private processes, shared processes or a combination of both.

An SVOT Operating System (SOS)

Getting a single version of the truth (SVOT) across an enterprise was the key advance behind the ERP systems. Unfortunately, as mentioned earlier, this was achieved at the expense of modularity, third-party development capabilities and extensibility.

Conversely, the modularity, third-party development and extensibility problem has also been solved. It has been solved through the concept of an 'Operating System'. Well known examples of these include Microsoft Windows and iPhone O/S. However, neither of these Operating Systems have a strong SVOT-requirement which would be key for any enterprise operating system.

One Network has built the first **SVOT Operating System** that combines Enterprise or Network SVOT with an Operating System.

The key technologies that make up the SVOT Operating System include:

• An **SDK** toolkit (built on the Open Source Eclipse platform) that allows developers (including third-parties) to build new applications on the platform without compromising SVOT. The language used in the SDK is *standard Java* so existing skills can be leveraged.
• Modularity which allows **SVOT applications** to be installed and uninstalled. SVOT applications have a versioning independent of the underlying platform. This is similar to how Microsoft Office is versioned separately from Microsoft Windows.
• The problem of modularity in data models was solved some time ago in Object-Oriented Technology through a technology called **mixins**. The One Network platform adapts the object-oriented mixin architecture to transactional, persistent data models allowing them to be modular as well. The mixin architecture allows multiple SVOT applications to independently extend the data models of "lower level" models without compromising SVOT.
• The mixin architecture forms the basis for a new kind of **Extensible Master Data Management** (E-MDM) and Common Transaction Management (E-CTM).
• A new **process inheritance architecture**. The problem of extensibility has been solved in the world of object-oriented programming through the use of inheritance. Unfortunately, the primary construct in an enterprise system is a Process and not an Object. Till now, there has been no commercially viable system that has implemented Process Inheritance. The One Network platform allows developers to inherit from processes that are built into the core platform and applications

while maintaining SVOT. This allows implementers to extend processes while being confident that core processes will continue to run correctly. This represents a huge advance in enterprise system extensibility. The implementer inherits processes through a tool called the **Studio** (which is also built on Eclipse).

• One Network platform based on the SVOT O/S along with the Software Development Kit (SDK) is available as a service to any 3rd party to build independent applications – Platform-as-a-Service (PaaS). The key difference of our platform from generic cloud computing platforms like force.com, facebook O/S, etc. is the SVOT characteristic that is the cornerstone of enterprise and multi-enterprise business applications.

The One Network platform is also designed to incrementally reach the final SVOT end-state. This is enabled through a technology called **Tunable System of Control**. This technology allows the system-of-record to be controlled at a fine-grained level and easily switched on and off.

Companies can over time migrate to a full-SVOT model or to some partial-SVOT model if they do not want to replace existing systems that are working well.

An Incremental Planning Architecture

As mentioned earlier, today's state of the art ERP and BOB systems have an in-memory batch-planning architecture for optimized decision support. While the One Network platform supports this mode of operation, it also supports a novel incremental planning architecture.

An incremental planning architecture allows an enterprise to run in a **sense-and-respond mode** which can significantly increase its responsiveness and efficiency for certain types of processes.

The key enabling technologies for sense-and-respond are:

• **Single Version of the Truth (SVOT)** is a necessary but not sufficient requirement to enable sense-and-respond.

• **Algorithm-driven partitioning of the optimization space.** Unlike traditional systems which are either unpartitioned or statically partitioned, the One Network platform allows each optimization algorithm to partition the optimization space in a unique way appropriate to its goals. Algorithm-driven partitioning is important because different 'events' require different portions of the optimization space to be traversed to determine the appropriate 'response'.

• **A horizontally scaling optimization architecture.** This allows problems of any size to be tackled with a linear increase in cost as problem size increases. Traditional optimization approaches have an exponential increase in cost as the problem size increases.

• **A computational grid that allows complex problems to be subdivided and then managed to completion.** The computational grid manages the computational dependencies and is robust in the face of server failures. It also guarantees computation completion via retries and re-dispatches.

• **A single unified data model between planning and execution.** The planning and execution data models are kept transactionally consistent.

• **Support for building new Incremental Planning Engines in the SDK.**

A Saas-Enabled Architecture

The One Network Platform is completely SaaS-enabled. It can run both a traditional multi-tenant SaaS architecture as well as a network SaaS architecture.

This, coupled with the SDK and Studio allows I.T. to focus on building truly-differentiated processes rather than worrying about the nuts and bolts of running these systems.

The One Network platform can also be deployed on-premise.

Conclusion

The One Network platform is a revolutionary platform that enables shared processes as easily as it enables private processes.

Through the SVOT Operating System (SOS) Architecture it allows companies to build (or have built for them) functionality that gives them a competitive differentiation in the marketplace while supporting a modular O/S approach with all the advantages that entails.

Through its Tunable System of Control architecture it allows processes to be gradually moved into an SVOT O/S architecture.

The Incremental Planning architecture revolutionizes how decision support can be executed.

Finally the SaaS architecture allows companies to reduce their hosting costs while using their I.T. resources to drive differentiated functionality via the Studio and SDK.

The One Network platform has been **proven in over 3000 companies** including some of the largest companies on the planet. It has been proven in several industries including Retail, CPG, HiTech and Govt. It has been scaled to the most demanding transactional and user volumes as well.

Next Steps

There are several possible next steps.
1) **Join an existing network** to execute shared processes with your partners.
2) **Set up a new many-to-many network** to transform your industry.
3) **Subscribe to our SaaS services** to extend your ERP.
4) Transform your enterprise with **transformative applications delivered on an SOS-enabled architecture**.

For more information on One Network's technology, please contact us:

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